

## SOME INFLUENCES OF STRUCTURE IN FILM-TYPE OXYGEN CATHODES

T. Katan  
Lockheed Palo Alto Research Laboratory  
Palo Alto, California 94304

and

E. A. Grens, II  
Department of Chemical Engineering, University of California  
Berkeley 94720

ABSTRACT

Measurements were taken of the performance of oxygen electrodes consisting of beds of silver spheres operating in 13.5 M KOH at 95°C. The intrinsic meniscus was positioned in a fine silver mesh, and silver spheres were added to the gas side of the mesh while constant cathodic current was applied. Classified spheres were used in sizes ranging from 14 to 156 microns in diameter, and electrode thickness was gradually increased to about 3000 microns. In these electrodes, the electrochemical reaction occurs beneath a film coating the walls of the gas-filled pores between the spheres.

Several effects can be observed when such electrodes are built up. Increased performance is generally noted until a certain thickness is obtained. For spheres with diameters of about 156 and about 86 microns, if the electrode is made thicker than 800 microns, little further improvement in performance is found. However, as successively smaller sphere sizes are used, the increase in performance expected for the increased specific surface area becomes offset by another, detracting influence. As electrode thickness is then built up beyond a certain thickness, performance is found to decrease with further increases in thickness. This effect may be an important factor in considerations of electrode design.